Trend Study 17-45-02

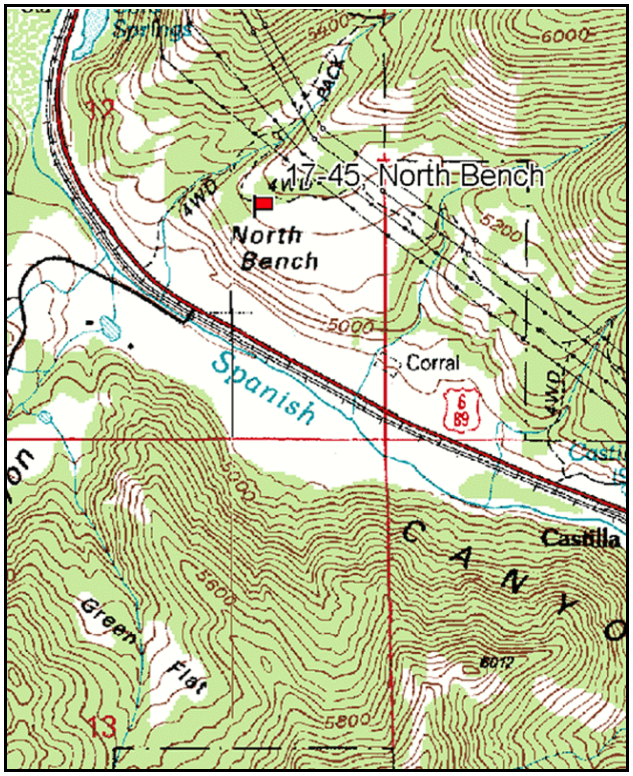
Study site name: North Bench . Vegetation type: Big Sagebrush .

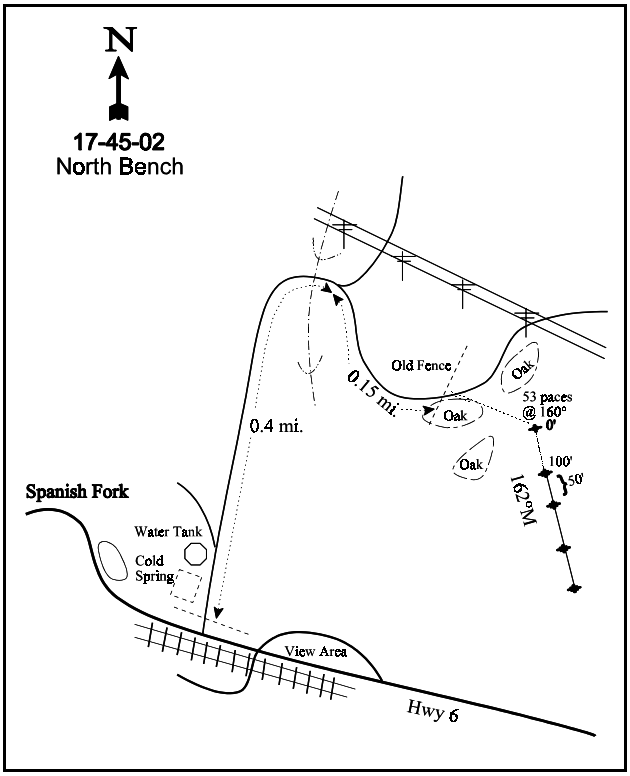
Compass bearing: frequency baseline 162 degrees magnetic.

Frequency belt placement: line 1 (11 & 95 ft), line 2 (34 ft), line 3 (59 ft), line 4 (71 ft).

LOCATION DESCRIPTION

From the west side of the view area in lower Spanish Fork Canyon (about 3.5 miles up from the mouth) look for a dirt road going up through a gate and by an old corral. Take this rough road for 0.4 miles to an intersection. Turn right and go 0.15 miles to the top of the bench and an old fence line. From the wood post near the left hand side of the road, walk 53 paces bearing 160 degrees into the sage flat. The first stake marks the 0-foot end of the baseline. The remainder of the study stakes are south at 100 foot intervals.





Map Name: Spanish Fork Peak

Diagrammatic Sketch

Township 9S , Range 3E , Section 12

GPS: NAD 27, UTM 12S 4432578 N 453862 E

DISCUSSION

North Bench - Trend Study No. 17-45

The North Bench trend study was established in 1989 and is located on a 40 acre piece of private land in lower Spanish Fork Canyon. The study samples a sagebrush/grass bench above Highway 6. These type of communities are limited in the bottom of the oakbrush dominated canyon and should be the first areas to reflect the pressures of increasing deer use. Deer sign was reportedly light in both 1989 and 1997. The bench has a south to southeast aspect, gentle slope (3-5%), and an elevation of 5,100 feet. Wildlife use remained low in 2002. A pellet group transect read on site in 2002 estimated only 8 deer days use/acre (20 ddu/ha) and 6 cow days use/acre (14 cdu/ha). Cattle pats were from 2001 and deer pellet groups appear to be from fall and winter use. Grasshoppers were abundant in 2002 and some utilization on herbaceous plants was apparent.

Soil textural analysis indicates a loamy soil with a slightly acidic soil reaction (pH 6.1). Effective rooting depth was estimated to be 20 inches with an average temperature of 44.6°F at about 18 inches. Few rocks were encountered in the soil profile and there is an clay horizon about 10 inches below the soil surface. There are currently no erosion problems due to abundant and well dispersed vegetative cover in conjunction with the gentle slope. The erosion condition class was determined to be stable in 2002.

Mountain big sagebrush is the obvious key species. It provided 88% of the shrub cover in 1997 and 85% in 2002. It had an estimated density of about 5,000 plants/acre in 1997 and 2002. Utilization has been mostly light since the site was established in 1989. Vigor has been normal on most plants but the number of decadent plants has fluctuated considerably. In 1989, a dry year, over half of the sagebrush sampled were classified as decadent. In 1997, the number of decadent plants dropped to only 9% then increased to 21% in 2002. Recruitment was exceptional in 1997, yet the population did not show an increase in 2002. Seedling survival appears to be limited by drought and the abundant herbaceous understory which is dominated by bulbous bluegrass.

The broom snakeweed population was abundant and healthy in 1997 and 2002. It has increased from 400 plants/acre in 1989 to 4,800 plants/acre in 2002. Clumps of large mature oak occur on the slopes near the bench and dominate the hillsides above, providing escape and thermal cover until leaf drop.

The herbaceous understory is abundant and dominated by the low value perennial, bulbous bluegrass. It provides almost continuous ground cover with a cover value of 32% in 1997 and 33% in 2002. Crested wheatgrass and Kentucky bluegrass are also fairly abundant.

The forb composition is diverse but contains several weedy species including yellow salsify, autumn willoweed, hairy goldaster, curlycup gumweed, and common dandelion. Most of these species indicate past excessive grazing, even with rest they will persist a long time on the site. The noxious weed, whitetop, was encountered on site in 2002 as well.

1989 APPARENT TREND ASSESSMENT

The soil appears stable. There is adequate protective ground cover to limit most erosion. As with several other studies on this herd unit, trend indicators point to a declining big sagebrush population. It is an older, decadent stand with only fair vigor and many dying plants. The sagebrush are not overused, there is just no reproduction. A year favorable to seedling establishment could quickly change the direction of long-term trend.

1997 TREND ASSESSMENT

The soil trend continues to be stable. Dense vegetative cover provided by bulbous bluegrass will help prevent erosion as well as the gentle slope. Browse trend is upward with a more healthy stand of mountain big sagebrush after some self thinning. The population is still relatively dense. Many young and seedling plants were encountered indicating an expanding population. Broom snakeweed also has a healthy population with a age class distribution indicating it will likely expand. The herbaceous understory trend is upward. Many new species were encountered in 1997, greatly raising the nested frequency for forbs. However, a better species composition is desired.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - up but composition poor (5)

2002 TREND ASSESSMENT

Trend for soil is up slightly due to a decline in cover of bare ground and an increase in vegetation cover. There is little bare ground exposed and erosion is minimal. Trend for the key browse species, mountain big sagebrush, is stable. Density remains similar to 1997 levels. The abundance of seedlings and young sampled in 1997 did not cause an increase in the already dense sagebrush population. Utilization remains light but the number of decadent plants increased to 21%. It appears that sagebrush seedling survival is somewhat limited by the abundant and weedy herbaceous understory. Trend for the herbaceous understory is stable. The low value perennial, bulbous bluegrass, still totally dominates the herbaceous understory by providing 65% of the total grass cover or 49% of the total herbaceous cover. It forms a nearly continuous cover in some areas. Sum of nested frequency for perennial grasses has increased slightly while frequency of perennial forbs declined. Nested frequency of the most common perennial grasses remained stable.

TREND ASSESSMENT
soil - up slightly (4)
browse - stable (3)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 45

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
G	Agropyron cristatum	202	198	221	73	67	70	9.33	12.38
G	Bromus tectorum (a)	-	14	-	-	4	-	.07	-
G	Dactylis glomerata	a5	ab12	b17	2	6	8	.70	.74
G	Poa bulbosa	a144	b358	b368	55	96	99	31.65	33.20
G	Poa pratensis	a43	b135	b143	17	45	54	4.02	4.80
G	Poa secunda	b314	a13	a9	91	6	6	.45	.03
Total for Annual Grasses		0	14	0	0	4	0	0.07	0
Total for Perennial Grasses		708	716	758	238	220	237	46.17	51.15
Total for Grasses		708	730	758	238	224	237	46.24	51.15
F	Artemisia ludoviciana	-	3	2	-	1	1	.15	.15
F	Aster chilensis	-	4	6	-	2	3	.15	.18

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
F	Cardaria draba	$_{a}$-	$_{a}$-	$_{b}$29	-	-	12	-	.35
F	Cirsium spp.	$_{a}$-	$_{b}$25	$_{a}$10	-	12	4	.68	.02
F	Collomia linearis (a)	-	-	2	-	-	1	-	.00
F	Comandra pallida	1	-	8	1	-	4	-	.04
F	Collinsia parviflora (a)	-	2	-	-	1	-	.00	-
F	Cynoglossum officinale	$_{a}$-	$_{c}$63	$_{b}$19	-	27	11	.72	.42
F	Epilobium brachycarpum (a)	-	$_{b}$152	$_{a}$57	-	61	26	.40	.20
F	Erigeron pumilus	$_{a}$1	$_{b}$31	$_{a}$-	1	14	-	.15	-
F	Grindelia squarrosa	$_{a}$25	$_{b}$80	$_{a}$7	8	35	3	1.09	.06
F	Helianthus annuus (a)	$_{b}$35	$_{b}$28	$_{a}$5	19	12	2	.25	.01
F	Heterotheca villosa	$_{a}$-	$_{b}$131	$_{c}$193	-	54	78	3.53	9.06
F	Lactuca serriola	6	6	-	2	3	-	.01	-
F	Lithospermum spp.	$_{b}$47	$_{a}$-	$_{a}$-	21	-	-	-	-
F	Lupinus argenteus	$_{a}$-	$_{b}$20	$_{b}$27	-	10	14	.95	1.26
F	Melilotus officinalis	-	4	1	-	2	1	.15	.00
F	Medicago sativa	$_{a}$1	$_{b}$14	$_{b}$20	1	6	11	.90	1.48
F	Polygonum douglasii (a)	-	3	-	-	1	-	.00	-
F	Taraxacum officinale	$_{a}$-	$_{c}$53	$_{b}$14	-	23	9	1.07	.32
F	Tragopogon dubius	$_{a}$61	$_{c}$205	$_{b}$133	31	80	61	2.44	2.50
Total for Annual Forbs		35	185	64	19	75	29	0.67	0.21
Total for Perennial Forbs		142	639	469	65	269	212	12.02	15.88
Total for Forbs		177	824	533	84	344	241	12.69	16.10

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 45

Type	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	Artemisia tridentata vaseyana	89	85	8.82	13.24
B	Chrysothamnus nauseosus albicaulis	1	0	-	-
B	Gutierrezia sarothrae	27	41	1.20	2.37
Total for Browse		117	126	10.02	15.61

Key Browse Annual Leader Growth
Herd unit 17 , Study no: 45

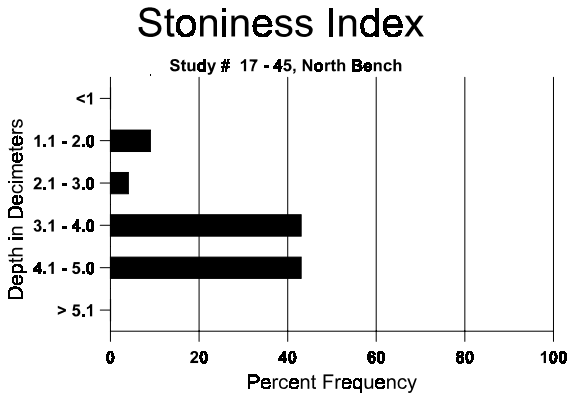
Species	Average leader growth (in)
	'02
Artemisia tridentata vaseyana	3.4

BASIC COVER --
Herd unit 17 , Study no: 45

Cover Type	Nested Frequency		Average Cover %		
	'97	'02	'89	'97	'02
Vegetation	396	394	24.00	59.20	71.77
Rock	20	5	.75	.10	.02
Pavement	88	36	1.25	.28	.14
Litter	394	369	58.25	39.26	37.77
Cryptogams	86	71	0	.97	.81
Bare Ground	259	167	15.75	10.44	5.02

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 45, North Bench

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
20.0	44.6 (17.7)	6.1	36.7	36.4	26.8	1.7	27.3	227.2	.4



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 45

Type	Quadrat Frequency		Pellet Transect	
	'97	'02	Pellet Groups per Acre ⁄02	Days Use per Acre (ha) ⁄02
Elk	-	1	-	-
Deer	1	7	104	8 (20)
Cattle	2	5	70	6 (14)

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 45

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	89	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	97	73	-	-	1	-	-	-	-	-	74	-	-	-	1480			74
	02	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	155	-	-	-	-	-	-	-	-	155	-	-	-	3100			155
	02	25	-	-	3	-	-	-	-	-	28	-	-	-	560			28
M	89	14	4	-	-	-	-	-	-	-	16	2	-	-	1200	29	31	18
	97	88	8	-	-	-	-	-	-	-	95	1	-	-	1920	36	42	96
	02	151	14	4	-	-	-	-	-	-	168	1	-	-	3380	19	23	169
D	89	23	3	-	-	-	-	-	-	-	24	-	2	-	1733			26
	97	23	1	-	-	-	-	-	-	-	12	-	-	12	480			24
	02	41	12	-	-	-	-	-	-	-	38	-	-	15	1060			53
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	860			43
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	720			36

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	16%	00%	04%	+45%
'97	03%	00%	04%	- 9%
'02	10%	02%	06%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	2999	Dec:		58%
'97	5500			9%
'02	5000			21%

Chrysothamnus nauseosus albicaulis																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	27	46	1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	28	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	0	Dec:	-
'97	20		-
'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	89	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	97	55	-	-	-	-	-	-	-	-	55	-	-	-	1100			55
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	89	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	97	66	-	-	-	-	-	-	-	-	66	-	-	-	1320			66
	02	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
M	89	3	-	-	-	-	-	-	-	-	3	-	-	-	200	6	8	3
	97	101	-	-	-	-	-	-	-	-	101	-	-	-	2020	6	7	101
	02	203	1	-	7	-	-	-	-	-	209	2	-	-	4220	8	8	211
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	02	19	-	-	-	-	-	-	-	-	18	-	-	1	380			19
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	+88%
'97	00%	00%	00%	+29%
'02	.41%	00%	.41%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	400	Dec:	0%
	'97	3400		2%
	'02	4800		8%